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LIFE AND CONSCIOUSNESS

I. THE ORIGIN OF LIFE

In the phenomenal world, everything has a beginning and an end. The ordinary mind, which never gets behind the obvious, consequently infers that the non-phenomenal primaries—matter, energy, and time—must have had a beginning also. But every system of philosophy that has sought an ultimate basis along a receding line of inquiry has found itself quickly projected into nothingness. The reason therefor being the human mind cannot know the absolute. Therefore when we place postulates concerning the unknowable between our knowledge and our ignorance and imagine that we have thereby secured a solid foundation for ratiocination we deceive ourselves with words devoid of meaning. Hence, speculation concerning the origin of life is idle. To trouble ourselves about it is to chase a phantasm. Life is a phenomenon, and simply *is*. To account for its being, we need no other postulates than those which every man with mind not smothered in the bog of metaphysics will freely admit to be experientially true—energy and matter as universal constants with time as a fourth dimension. These granted, it follows that all their combinations eventuating in realities to the mind of man are simple resultants in an infinite series, *one member of which is life*.

II. WHAT LIFE IS

Descartes commenced his famous treatise on philosophy with the thesis—"I think, therefore I am" (*cogito, ergo sum*), a statement open to the criticism that it begs the question by fallaciously incorporating with the suppressed major premise—*Thinking things are*—that which is to be proved: *ego*, a conscious, thinking, reasoning agent, and *existence*. The expression is a tautology—I am, therefore I am. I opine that metaphysics can get no farther than this. Therefore in the present enquiry I purpose to eschew its methods of investigation for those of physical science.

We have no difficulty in distinguishing an apple from an

onion or a clap of thunder from the ticking of a clock because each of these phenomena presents to our consciousness a group of characteristic sensations that is individualistic. It is obvious that we shall recognize and understand life, precisely as we recognize and understand other objective phenomena, by means of charactersitic marks. Let us look for them.

All bodies are in relative motion. Making this our point of departure, we perceive at once that bodies fall into two classes: *Class A* includes those bodies that move only when acted upon by an external force and in such wise that their present state depends exclusively upon what took place at the preceding instant. So that the body behaves as though it were a material point in a system of such points, its position being determined by the position of the same points at the immediately antecedent moment and capable of being expressed by a series of differential equations in which time is an independent variable. A billiard ball is a familiar example. *Class B* includes those bodies whose present state cannot be completely explained by their state at a preceding moment in such wise as to be fully expressed by an equation. A swimming fish will serve as an example. Structurally, bodies of class A are homogeneous, that is they are destitute of functioning parts; but bodies of class B are heterogeneous, that is they have functioning parts.

It is necessary to observe closely the distinction between the participial adjective *functioning* and the simple adjective *functional*, because some bodies now in class A were once in class B as, for example, a deceased cat, which certainly has functional parts although they are not now functioning. A heterogeneous body whose organs are functioning we say is *alive*, while one whose organs are not functioning we say is *dead*. A homogeneous body we say is *not-alive*. In every-day speech, the term "dead matter" is often applied figuratively to inorganic bodies; but it would be a misnomer in a technical discussion and lead to confusion, for inorganic bodies have always been not-alive while only the alive may become the dead.

Now when bodies of class B move they do so by means of their functioning parts, and their movements cannot be calculated because they may only be represented by an equation

containing a dependent variable, spontaneity, whose coefficient remains unknown. This gives us the first index of life — *spontaneous movement by the use of organs*.

The microscope, however, reveals minute beings devoid of organs but possessing the power of spontaneous movement and incontestably alive. The amœba, although not precisely of microscopic size, will serve well as an illustration of these creatures. It appears like a drop of colorless jelly. Locomotion is accomplished by the extension and withdrawal of a portion of its mass from any part. Nutrition is secured by the matter of which the animalcule is composed enveloping a food particle by viscous flow, non-nutritive particles being eliminated by the simple process of flowing away from them. Reproduction is carried on by fission, a portion of the mass becoming detached and setting forth on a career of its own.

Such beings have no permanent functional parts. But a definite connection between them and the higher types of life is found in the fact that all alike have as their unit of structure the cell and a peculiar chemical compound called protoplasm. This substance is composed of specific chemical elements associated in a definite molecule. Its distinguishing characteristic is sensibility, by which I mean *sense perception*. We are inclined to associate something miraculous, or at all events mystic, with this factor of life. But there is no real reason why sensibility should be regarded in this manner. Essentially, it is no more marvellous than other distinguishing characteristics of molecules. To illustrate: Aluminum, oxygen, and silica combined in one way form clay whose distinguishing mark, we may assume, is opacity; but combined into a different molecular adjustment they form glass, whose chief distinguishing mark is transparency. So, certain elements united in a certain way we may call "earthy matter": it is non-sensitive, inert. But combined in a different molecular adjustment, the very same elements manifest sensibility; it is now normal protoplasm.

On account of their cell structure and its method of functioning, all alive beings are said to be organized. Non-organized and dead bodies constitute class A, and functioning organized bodies constitute class B. Wherever we discover spontaneous

movement there we always find normal protoplasm organized into a cell or an assemblage of cells. This extends the range of our first index of life into *mark 1: spontaneous movement*; and simultaneously gives us a second index—*mark 2: normal protoplasm*.

We may identify a body as alive by means of these two marks. They suffice to show the presence of life but do not tell us what life is. At this stage, we must discard the instruments used thus far (biology and chemistry) and pass to physics. From this science we learn that whatever produces motion is energy, and that the varieties of energy, collectively termed forces, are named from their manner of manifestation. We are now in possession of all the data needed for the framing of a definition. *Life is that specific manifestation of energy which is found associated with protoplasm and manifests itself by spontaneous movement.*

We often hear it remarked that "life is a mystery." So it is; and so is electricity. But neither is a particle less or more mysterious than the other.

III. CONSCIOUSNESS

Observation of that which I call my body convinces me that it is alive, because it evidences all the marks of life. In addition, I see here localized an awareness of self and not-self. Whoever might venture to deny this, I cannot, else there remains for me no knowledge of anything. And this is to predicate pure non-existence of everything.

Further, I find this awareness to be—not merely localized "here," but—associated with the organs of my body, thus:—

<i>Organ</i>	<i>sense</i>	<i>presentation</i>
Eye	sight	{ color, distance, form, perspective.
Skin	touch	{ "feel," temperature, shape, and pressure.
Nose	smell	odors, and "feels."
Ear	audition	{ noise, harmonious tones, equilibrium.
Mouth	taste	flavors, and "feels."
Joints and muscles	movement	{ bodily motions, pres- sure, and weight.

I am also aware that I have not always been aware. I have no awareness of the first year of my life, nor of several hours of last night.

It thus appears that my awareness is the result of (1) bodily composition and structure (see II, above), and (2) stimulus from without. So that the prerequisites to consciousness are, *first*, a protoplasmic cellular organism; *second*, specific kinds of energy pulsing upon it; *third*, orientation or adjustment of the cells to lines-of-force; *fourth*, the automatic adjustment of groups of cells in a series to familiar (or repeated) forces without direct stimulus on each group of the chain. The last-named adjustment is called *cell memory*. The evolutionary development which has converted a unicellular organism like the amoeba into a multicellular complex with functional groups of cells like the human body was a long process requiring many millions of years for its accomplishment.

But in the human infant there is no consciousness:—

The infant new to earth and sky
What time its tender palm is prest
Against the circle of the breast
Has never thought that *this is I*.

At this period of life, the cells of the body are evidently collocated in series by heredity and possessed of capacity to orient under stress. If at this time a lump of loaf sugar be put into the hand of the child and at the same instant it hear pronounced the word *sugar*, it receives through the ear the sensation of sound, through the hand the percepts of hardness and weight, through the eye and hand conjointly those of form and dimension, and finally the organs of taste and digestion add those sensations of sweetness and satisfaction which complete the concept that goes with the word *sugar*. One group of cells after another has been forced into alignment to give a complex sensation whose whole name is *loaf sugar*. A repetition of this process at intervals during a few weeks establishes a train of nerve-cell adjustments. Cell memory has been set up. Thereafter, this entire series of adjustments may be produced by a renewal of but one or two of the original sensations, the remainder being interpolated automatically.

Such serial adjustment of nerve cells accompanied by a certain grade of strain gives rise to a new sensation, *awareness*. My awareness is my consciousness. Since consciousness is only a complex sensation resulting from strain, it varies from the stress of no part of my organism to that of a considerable part of it but never (probably) to all of it. That is to say, consciousness varies in degree from zero to a maximum, and is a transient specific property of normal protoplasm.

Consciousness is the *ego*, and is designated by the first personal pronoun. From the above data, we deduce this definition: *Consciousness is individual awareness in a protoplasmic organism of self and not-self and is identical with the complex sensation of stress accompanying cell adjustment to lines of force.*

Consciousness is generally called *the soul*, a term employed with quite different significations by philosophers. Plato was one of the first (if not the first) to use the word. But in his philosophy the soul is not conscious. He uses the word to designate a locus for "ideas" by which he means self-existent entities. He teaches that whenever the "idea" my-self floats into the locus my-soul, self-consciousness comes into existence; and when it floats out of this locus, consciousness of self ceases. The man in the street probably thinks of his soul as *something inside him*. But if his ego is something inside *him*, what then is *he*? As pointed out in section I, such yolk-in-the-egg philosophy leads nowhither. And the only conclusion empirical science and logic justifies is this: *Consciousness (or ego, or soul) is a characteristic property ("mark") of matter when organized in a specific way (protoplasm).*

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